IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	Atty. Docket
ERIK G.P. SCHUIJERS ET AL.	PHNL 030459
Serial No.: 10/552,772	Group Art Unit: 2626
Filed: October 12, 2005	Examiner: J.S. Pullias
	Confirmation No.: 2201

AUDIO SIGNAL SYNTHESIS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

APPEAL BRIEF

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(i) Real Party in Interest

The real party in interest in this application is KONINKLIJKE PHILIPS ELECTRONICS N.V. by virtue of an assignment from the inventors recorded on October 12, 2005, at Reel 017863, Frame 0154, and corrected on May 13, 2009, at Reel 022677, Frame 0920.

(ii) Related Appeals and Interferences

There are no other appeals and/or interferences related to this application.

(iii) Status of Claims

Claims 1, 16 and 19-22 stand finally rejected by the Examiner. Claims 2-15, 17 and 18 have been cancelled. Appellants hereby appeal the rejection of claims 1, 16 and 19-22.

(iv) Status of Amendments

There was one Amendment filed on January 22, 2009, after final rejection of the claims on October 24, 2008, this Amendment having been considered and entered by the Examiner.

(v) Summary Of Claimed Subject Matter

The subject invention relates to a method and apparatus for synthesizing an audio signal. In particular, as claimed in claim 1, the method includes "A method for generating a wideband time domain output audio signal comprising a left hand audio signal component and a right hand signal component from a wideband time domain input audio signal, the method comprising the steps of:

transforming the wideband time domain input audio signal to a sub-band domain input signal comprising a plurality of input sub-band signals, the input sub-band signals in a first frequency range of the wideband frequency range having a narrower frequency band than the input sub-band signals in a second frequency range of the wideband frequency range ***(sub band input 0 - sub band input N, T_0 - T_n, Fig. 3; specification page 4, lines 16-21)***;

delaying the sub-band signals so as to obtain delayed sub-band signals ***(D0-DN, Fig. 3; specification page 4, lines 21-22)***;

deriving a first and a second processed sub-band signal by mixing a sub-band signal and a corresponding delayed sub-band signal ***(outputs from processors P, Fig. 3; specification page 4, lines 22-27)***;

inverse transforming the first processed sub-band signals so as to obtain the left hand audio signal component of the wideband time domain output audio signal, and inverse transforming the second processed sub-and signals so as to obtain the right hand audio signal component of the wideband time domain output audio

signal ***(transforms T_0^{-1} - T_n^{-1}, Fig. 3; specification page 4, line 27 to page 5, line 2)***.

As claimed in claim 16, the apparatus includes "A device for generating a wideband time domain output audio signal comprising a left hand audio signal component and a right hand signal component from a wideband time domain input audio signal, the device comprising:

a transformer unit for transforming (T) the wideband time domain input audio signal into a sub-band domain input signal comprising a plurality of input sub-band signals, the input sub-band signals in a first frequency range of the wideband frequency range having a narrower frequency band than the input sub-band signals in a second frequency range of the wideband frequency range ***(sub band input 0 - sub band input N, T_0 - T_n, Fig. 3; specification page 4, lines 16-21)***;

a delay unit for delaying the sub-band signals so as to obtain delayed sub-band signals ***(D0-DN, Fig. 3; specification page 4, lines 21-22)***;

a mixing unit for deriving a first and a second processed signal by mixing a sub-band signal and a corresponding delayed sub-band signal ***(outputs from processors P, Fig. 3; specification page 4, lines 22-27)***; and

an inverse transformation unit for inverse transforming the first processed sub-band signals so as to obtain the left hand audio signal component of the wideband time domain output audio signal, and for inverse transforming the second processed sub-band

signals so as to obtain the right hand audio signal component of the wideband time domain output audio signal ***(transforms T_0^{-1} - T_n^{-1}, Fig. 3; specification page 4, line 27 to page 5, line 2)***.

With regard to the device of claim 16, as claimed in claim 20, "wherein the transformation unit comprises:

a first transformation block for transforming the wideband time domain input audio signal into a plurality of narrow band sub-band signals in said first and second frequency range ***(sub-band analysis filter, Fig. 5; specification page 5, lines 31-34)***;

a second transformation block for transforming the narrow band sub-band signals in said first frequency range into the input sub-band signals in said first frequency range, the bandwidth of the input sub-band signals in said first frequency range being smaller than the bandwidth of the narrow band sub-band signals in said first frequency range ***(T_0 - T_n, Fig. 3; specification page 4, lines 16-21)***; and

a delay block for delaying the narrow band sub-signals in the second frequency range so as to obtain the input sub-band signals in said second frequency range ***(DT, Fig. 3; specification page, lines 19-21)***,

and wherein the inverse transformation unit comprises:

a first inverse transformation block for inverse transforming the first processed sub-band signals in said first frequency range into first processed narrow band sub-band signals in said first frequency range, the bandwidth of the first processed narrow band sub-band signals being larger than the bandwidth of the first

processed sub-band signals ***(transforms T_0^{-1} - T_n^{-1} producing sub band output 0-n, left, Fig. 3; specification page 4, line 27 to page 5, line 2)***;

a second inverse transformation block for inverse transforming the second processed sub-band signals in said first frequency range into second processed narrow band sub-band signals in said first frequency range, the bandwidth of the second processed narrow band sub-band signals being larger than the bandwidth of the second processed sub-band signals ***(transforms T_0^{-1} - T_n^{-1} producing sub band outputs 0-n, right, Fig. 3; specification page 4, line 27 to page 5, line 2)***;

a third inverse transformation block for inverse transforming the first processed narrow band sub-band signals in said first frequency range and the first processed sub-band signals in said second frequency range into said left hand audio signal component of the wideband time domain audio output signal ***(sub-band synthesis filter producing left signal, Fig. 5; specification page 6, lines 2-3)***; and

a fourth inverse transformation block for inverse transforming the second processed narrow band sub-band signals in said first frequency range and the second processed sub-band signals in said second frequency range into said right hand audio signal component of the wideband time domain output audio signal ***(sub-band synthesis filter producing right signal, Fig. 5; specification page 6, lines 2-3)***.

(vi) Grounds of Rejection to be Reviewed on Appeal

(A) Whether the invention, as claimed in claims 1, 16 and 19, is anticipated, under 35 U.S.C. 102(e), by U.S. Patent 7,006,636 to Baumgarte et al.

(B) Whether the invention, as claimed in claims 20-22, is unpatentaable, under 35 U.S.C. 103(a), over Baumgarte et al. in view of U.S. Patent 5,774,844 to Akagiri.

(vii) Arguments

(A) Whether Claims 1, 16 and 19 Are Anticipated

By Baumgarte et al.

35 U.S.C. 102(e) states:

"A person shall be entitled to a patent unless -

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(e) the invention was described in — (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for the purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language;...."

The Baumgarte et al. patent discloses coherence-based audio coding and synthesis, in which an audio signal is encoded and transmitted, along with binary cue coding (BCC) parameters, to a receiver which, using the encoded audio signal and the BCC parameters, generates a stereo signal.

As claimed in claim 1 (as well as claim 16), the subject invention includes the limitations "transforming the wideband time domain input audio signal to a sub-band domain input signal comprising a plurality of input sub-band signals, the input sub-band signals in a first frequency range of the wideband frequency range having a narrower frequency band than the input sub-band signals in a second frequency range of the wideband frequency

range", "delaying the sub-band signals so as to obtain delayed sub-band signals", "deriving a first and a second processed sub-band signal by mixing a sub-band signal and a corresponding delayed sub-band signal" and "inverse transforming the first processed sub-band signals so as to obtain the left hand audio signal component of the wideband time domain output audio signal, and inverse transforming the second processed sub-and signals so as to obtain the right hand audio signal component of the wideband time domain output audio signal".

As noted in MPEP §2131, it is well-founded that "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California,* 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Further, "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.,* 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The Examiner has indicated that Baumgarte et al. teaches:

> "transforming the wideband time domain input audio signal to a sub-band domain input signal comprising a plurality of input sub-band signals (Fig 4, TF transforms), the input sub-band signals in a first frequency range of the wideband frequency range having a narrower frequency band than the input sub-band signals in a second frequency range of the wideband frequency range (Col 6 lines 25-31, critical bands inherently cover frequency ranges varying in width, with the higher bands wider)".

Appellants submit that while Baumgarte et al. does teach "transforming the wideband time domain input audio signal to a sub-

band domain input signal comprising a plurality of sub-band signals" (while the Examiner indicates Fig 4, TF transforms, actually, Fig 5 showing TF transform 502 transforming the mono signal is more appropriate), there is no disclosure or suggestion of "the input sub-band signals in a first frequency range of the wideband frequency range having a narrower frequency band than the input sub-band signals in a second frequency range of the wideband frequency range". In particular, Baumgarte et al., at col. 6, lines 25-35, states:

> "Each transform block generates a number of outputs corresponding to different frequency sub-bands of the input audio signals. Coherence estimator 406 characterizes the coherence of each of the different sub-bands and averages those coherence measures within different groups of adjacent sub-bands corresponding to different critical bands. Those skilled in the art will appreciate that, in preferred implementations, the number of sub-bands varies from critical band to critical band with lower-frequency critical bands have fewer sub-bands than higher-frequency critical bands."

Appellants first would like to point out that this section of Baumgarte et al. is describing the generation of the coherence measures (BCC parameters), and not the processing of a wideband time domain input audio signal. Further, Baumgarte et al. merely states that the number of sub-bands in lower frequency critical bands are fewer than the number of sub-bands in higher frequency critical bands. However, since higher frequency bands typically have wider frequency ranges than lower frequency bands, this would lead one skilled in the art to assume that in Baumgarte et al., the sub-bands have the same or similar frequency ranges. While, as noted by the Examiner, "critical bands inherently cover frequency

ranges varying in width, with the higher bands wider", the subject limitation is concerned with the frequency ranges of the sub-bands, and as such, the limitation is not taught by Baumgarte et al.

As noted by the Examiner, Baumgarte et al. discloses delaying the sub-band signals, and differentially weighting left and right frequency components. However, claim 1 includes the limitation "deriving a first and a second processed sub-band signal by mixing a sub-band signal and a corresponding delayed sub-band signal".

Baumgarte et al. at col. 7, lines 41-50, states:

> "According to the audio synthesis processing described in the '877 and '458 applications, prior to the frequency components being applied to inverse TF transforms 506 and 508, weighting factors wL and wR are applied to the left and right frequency components, respectively, in each sub-band in order to move the corresponding auditory object left or right in the synthesized auditory scene. In order to maintain constant audio signal energy, the weighting factors are preferably selected such that Equation (7) applies as follows: wL2+ wR2=1. (7)"

Appellants submit that from the above, Baumgarte et al. teaches differentially weighting the left and right frequency components. However, there is no disclosure or suggestion deriving the first and second processed sub-band signal by mixing a (un-delayed) sub-band signal and a corresponding delayed sub-band signal.

B. Whether Claims 20-22 Are Unpatentable Over Baumgarte et al. In View Of Akagiri

35 U.S.C. 103(a) states:

> “(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.”

The above arguments concerning Baumgarte et al. are incorporated herein.

The Akagiri patent discloses methods and apparatus for quantizing, encoding and decoding and recording media therefore, which includes transformation blocks and inverse transformation blocks. However, Appellants submit that Akagiri does not supply that which is missing from Baumgarte et al., i.e., “transforming the wideband time domain input audio signal to a sub-band domain input signal comprising a plurality of input sub-band signals, the input sub-band signals in a first frequency range of the wideband frequency range having a narrower frequency band than the input sub-band signals in a second frequency range of the wideband frequency range”, “delaying the sub-band signals so as to obtain delayed sub-band signals”, “deriving a first and a second processed sub-band signal by mixing a sub-band signal and a corresponding delayed sub-band signal” and “inverse transforming the first processed sub-band signals so as to obtain the left hand audio signal component of the wideband time domain output audio signal, and inverse transforming the second processed sub-and signals so as

to obtain the right hand audio signal component of the wideband time domain output audio signal”.

Based on the above arguments, Appellants believe that the subject invention is neither anticipated nor rendered obvious by the prior art, either individually or collectively, and as such, is patentable thereover. Therefore, Appellants respectfully request that this Board reverse the decisions of the Examiner and allow this application to pass on to issue.

Respectfully submitted,

by /Edward W. Goodman/
Edward W. Goodman, Reg. 28,613
Attorney

(viii) <u>Claims Appendix</u>

1. (Previously Presented) A method for generating a wideband time domain output audio signal comprising a left hand audio signal component and a right hand signal component from a wideband time domain input audio signal, the method comprising the steps of:

transforming the wideband time domain input audio signal to a sub-band domain input signal comprising a plurality of input sub-band signals, the input sub-band signals in a first frequency range of the wideband frequency range having a narrower frequency band than the input sub-band signals in a second frequency range of the wideband frequency range;

delaying the sub-band signals so as to obtain delayed sub-band signals;

deriving a first and a second processed sub-band signal by mixing a sub-band signal and a corresponding delayed sub-band signal;

inverse transforming the first processed sub-band signals so as to obtain the left hand audio signal component of the wideband time domain output audio signal, and inverse transforming the second processed sub-and signals so as to obtain the right hand audio signal component of the wideband time domain output audio signal.

2-15. (Cancelled).

16. (Previously Presented) A device for generating a wideband time domain output audio signal comprising a left hand audio signal component and a right hand signal component from a wideband time domain input audio signal, the device comprising:

a transformer unit for transforming (T) the wideband time domain input audio signal into a sub-band domain input signal comprising a plurality of input sub-band signals, the input sub-band signals in a first frequency range of the wideband frequency range having a narrower frequency band than the input sub-band signals in a second frequency range of the wideband frequency range;

a delay unit for delaying the sub-band signals so as to obtain delayed sub-band signals;

a mixing unit for deriving a first and a second processed signal by mixing a sub-band signal and a corresponding delayed sub-band signal; and

an inverse transformation unit for inverse transforming the first processed sub-band signals so as to obtain the left hand audio signal component of the wideband time domain output audio signal, and for inverse transforming the second processed sub-band signals so as to obtain the right hand audio signal component of the wideband time domain output audio signal.

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17-18. (Cancelled).

19. (Previously Presented) The device as claimed in claim 16, wherein the first frequency range is a low frequency portion of the wideband frequency range and the second frequency range is a high frequency portion of the wideband frequency range.

20. (Previously Presented) The device as claimed in claim 16, wherein the transformation unit comprises:

a first transformation block for transforming the wideband time domain input audio signal into a plurality of narrow band sub-band signals in said first and second frequency range;

a second transformation block for transforming the narrow band sub-band signals in said first frequency range into the input sub-band signals in said first frequency range, the bandwidth of the input sub-band signals in said first frequency range being smaller than the bandwidth of the narrow band sub-band signals in said first frequency range; and

a delay block for delaying the narrow band sub-signals in the second frequency range so as to obtain the input sub-band signals in said second frequency range,

and wherein the inverse transformation unit comprises:

a first inverse transformation block for inverse transforming the first processed sub-band signals in said first frequency range into first processed narrow band sub-band signals in said first frequency range, the bandwidth of the first processed narrow band sub-band signals being larger than the bandwidth of the first processed sub-band signals;

a second inverse transformation block for inverse transforming the second processed sub-band signals in said first frequency range into second processed narrow band sub-band signals in said first frequency range, the bandwidth of the second processed narrow band sub-band signals being larger than the bandwidth of the second processed sub-band signals;

a third inverse transformation block for inverse transforming the first processed narrow band sub-band signals in said first frequency range and the first processed sub-band signals in said second frequency range into said left hand audio signal component of the wideband time domain audio output signal; and

a fourth inverse transformation block for inverse transforming the second processed narrow band sub-band signals in said first frequency range and the second processed sub-band signals in said second frequency range into said right hand audio signal component of the wideband time domain output audio signal.

21. (Previously Presented) The device as claimed in claim 16, wherein the mixing unit derives the first and a second processed sub-band signal from the sub-band signal and the corresponding delayed sub-band signal under the influence of parameter signals.

22. (Previously Presented)The device as claimed in claim 21, wherein the mixing unit derives the first processed sub-band signal by combining, in a first combining step, the sub-band signal and the corresponding delayed sub-band signal under the influence of

the parameter signals, and derives the second processed sub-band signal by combining, in a second combining step, the sub-band signal and the corresponding delayed sub-band signal under the influence of the parameter signals, said combining steps including scaling and/or phase modifying the sub-band signal and the corresponding delayed sub-band signal.

(ix) Evidence Appendix

There is no evidence which had been submitted under 37 C.F.R. 1.130, 1.131 or 1.132, or any other evidence entered by the Examiner and relied upon by Appellant in this Appeal.

(x) <u>Related Proceedings Appendix</u>

Since there were no proceedings identified in section (ii) herein, there are no decisions rendered by a court or the Board in any proceeding identified pursuant to paragraph (c)(1)(ii) of 37 C.F.R. 41.37.